

WHAT IS CLAIMED IS:

1. 1. A chemical mechanical polishing method, comprising:
 2. determining a vertical position of a top surface of a polishing pad in a chemical
 3. mechanical polishing system using a pad height sensor;
 4. positioning a window disposed in an aperture of the polishing pad such that the
 5. top surface of the window is at about the same vertical position of the top surface of the
 6. pad based on the determination; and
 7. polishing a wafer.
1. 2. The method of claim 1, further comprising:
 2. determining an endpoint of the polishing; and
 3. stopping the polishing upon reaching the endpoint.
1. 3. The method of claim 1, further comprising draining slurry and waste product from
2. the aperture.
1. 4. The method of claim 1, further comprising:
 2. lowering the window; and
 3. conditioning the pad after lowering the window.
1. 5. The method of claim 1, wherein the window is coated with a slurry-phobic
2. substance.

1 6. The method of claim 1, wherein determining the height comprises:
2 determining a distance between a pad height sensor positioned above a polishing
3 pad and the polishing pad; and
4 subtracting the determined distance from a known distance between the pad
5 height sensor and a surface on which the polishing pad rests.

1 7. The method of claim 1, further comprising:
2 positioning additional windows disposed in apertures of the polishing pad such
3 that the top surface of each window is at about same vertical position of the top surface of
4 the pad.

1 8. A CMP system, comprising:
2 a polishing pad having an aperture;
3 a pad height sensor positioned above the polishing pad;
4 a window vertically moveable within the aperture; and
5 a window raising mechanism capable of adjusting the vertical position of the
6 window based on information from the pad height sensor.

1 9. The system of claim 8, further comprising an endpoint measurement sensor
2 positioned beneath the window.

1 10. The system of claim 8, further comprising a drain disposed in the aperture.

1 11. The system of claim 8, further comprising a pad dresser.

1 12. The system of claim 8, wherein the window is coated with a slurry-phobic
2 substance.

1 13. The system of claim 8, further comprising additional windows, each window
2 disposed in an additional aperture of the polishing pad, and wherein each window is
3 movable between a lowered position and raised position at about the height of the
4 polishing pad as determined by the pad height sensor.

1 14. The system of claim 8, wherein the window rests on an inflatable toroid coupled
2 to a pump.

1 15. The system of claim 8, wherein the window rests on a plurality of cylinders, each
2 partially disposed in an airtight chamber coupled to a solenoid valve.

1 16. A CMP system, comprising:
2 means for determining a vertical position of a top surface of a polishing pad in a
3 chemical mechanical polishing system;
4 means for positioning a window disposed in an aperture of the polishing pad such
5 that the top surface of the window is at about the same vertical position of the top surface
6 of the pad based on feedback from the means for determining and

7 means for polishing a wafer.

1 17. A CMP control system, comprising:

2 a rate/height data structure holding data indicating the relationship between the
3 vertical position of a window disposed within an aperture of a polishing pad and control
4 data for a window-raising mechanism;

5 a sensor engine capable of receiving distance data from a pad height sensor
6 positioned above the polishing pad;

7 a pump engine, communicatively coupled to the sensor engine and the data
8 structure, capable of sending commands to the window-raising mechanism based on
9 control data related to the received distance data, to raise the window to about the height
10 of the polishing pad.

1 18. The system of claim 17, wherein the window raising mechanism is a pump

2 coupled to an inflatable toroid.

1 19. The system of claim 17, wherein the window raising mechanism is a solenoid
2 valve coupled to a plurality of chambers having cylinders disposed therein.

1 20. A computer-readable medium having stored thereon instructions to cause a
2 computer to execute a method, the method comprising:

3 receiving distance data from a pad height sensor positioned above a polishing pad;
4 calculating a height of the polishing pad based on the received distance data; and

5 transmitting an instruction to a window-raising mechanism based on the
6 calculation that will raise a window disposed within an aperture of a polishing pad to
7 about the calculated height of the polishing pad.

1 21. The computer-readable medium of claim 20, wherein the window raising
2 mechanism is a pump coupled to an inflatable toroid.

1 22. The computer-readable medium of claim 20, wherein the window raising
2 mechanism is a solenoid valve coupled to a plurality of chambers having cylinders
3 disposed therein.

1 23. A chemical mechanical polishing system, comprising:
2 a platen; and
3 a raised window coupled to the platen and sized to fit within an aperture of a
4 polishing pad.

1 24. The system of claim 23, further comprising a drain system disposed in the platen,
2 the drain system having an orifice positioned near the window.

1 25. The system of claim 23, wherein the window is coupled to the platen via a
2 window-raising mechanism.